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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III

841 Chestnut Building  
Philadelphia, Pennsylvania 19107

SUBJECT: AVTEX RISK ASSESSMENT

DATE: 31 Aug 88

FROM: BRUCE MOLHOLT *Bm*

TO: RUTH RZEPSKI

I have reviewed the Risk Assessment portion of the Geraghty & Miller RI report for Avtex Fibers, Front Royal, VA, dated August 1988. I comment here regarding both my peer review of this section and the toxicology of carbon disulfide in air emissions, a related subject which was introduced through review of documents submitted this past week by Avtex Fibers, Inc.

RI Risk Assessment

Overall, I have no important criticisms of the Risk Assessment as performed by G&M. Although their discussion of arsenic carcinogenicity at the MCL is damning to this Agency, it is, essentially, correct. Perhaps it is a minor point, but arsenic should be referred to as a known rather than suspected human carcinogen at the top of p. 6.16.

Concerning groundwater clean up levels, the 0.7 ppm guideline for CS<sub>2</sub> is appropriate. H<sub>2</sub>S and Cd levels were deferred pending further characterization of background in the area of the plant; however, I would anticipate that these clean up levels should not exceed 0.1 ppm and 0.01 ppm based upon the RfD for H<sub>2</sub>S and MCL for Cd, respectively.

Inhalation Toxicity of CS<sub>2</sub>

It will become necessary to comment more completely on this topic in time, however, I find it appropriate to insert a preamble to further commentary here. During the interim between our meeting with representatives of G&M and Avtex Fibers of August 19th and receipt of the RI Report on August 26th I received documentation from Avtex Fibers meant to refute the current OSHA directive to reduce the TLV for CS<sub>2</sub> from 20 ppm to 1 ppm. Upon review of these documents and other literature concerning CS<sub>2</sub> toxicity, I offer the following comments.

Whereas an extensive epidemiologic study of causes of death is appropriate for some substances, such as carcinogens, such study is relatively worthless in definition of the human toxicology of CS<sub>2</sub>. As should be obvious, there are many im-

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portant human toxicologic reactions, short of death, which are debilitating, and which do not necessarily in themselves increase mortality.

A review of the extensive document describing CS<sub>2</sub> toxicology by Beauchamp et al\* shows that there are several thresholds at which various toxicological effects are seen upon inhalation of CS<sub>2</sub>, with lethal concentrations of this gas being much higher than these thresholds. Minimal lethal concentrations (LC<sub>10</sub>) values for CS<sub>2</sub> in various test animal systems vary from 2000 to 4000 ppm, equivalent to about 10 grams of CS<sub>2</sub> per cubic meter of air. This is hardly a concentration of CS<sub>2</sub> ever encountered in the workplace, let alone in ambient air around the Avtex Fiber plant. Hence, mortality frequencies are not the issue. However, a careful medical questionnaire and intensive followup of the workforce might be revealing about some of the toxicities detailed below - a study not commissioned by Avtex Fibers and others in industries using CS<sub>2</sub>.

In the following table, I have summarized toxicity thresholds for only a few animal species (rat, rabbit and dog) rather than all those which have been studied in order to minimize species-to-species variation. I have also only considered a few toxic endpoints as indicative of various thresholds rather than attempting an exhaustive listing of all toxicities.

#### THRESHOLDS FOR CS<sub>2</sub> TOXICITY\*

<u>Air PPM</u>	<u>Toxic endpoint</u>
0.006	Altered EEG, reduced neuraminic acid aldolase and lysosomal activity (brain)
3	Increased brain acetylcholinesterase activity
32	Alterations in endocrine function (increased thyroid, decreased adrenal and ovarian activities)
200	Vacuolation of hepatocytic cytoplasm (liver)
400	Increased serum cholesterol, fragmentation of axis cylinders in peripheral nerves, demyelination, vascular lesions (brain), Purkinje cell lesions (brain), tremors, ataxia
750	Decreased motor conduction velocity (sciatic nerve)
2000	Death

\*Beauchamp et al CRC Crit. Rev. Toxicol. 11, 169-278 (1983)

cc: Laura Boornazian

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